Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Manacle and Cedar Creeks

Waterbody Segment at a Glance:

Counties: Callaway, Boone
Nearby Cities: Columbia, Fulton
Length of impairment:
Manacle: 2 miles
Cedar: 1 mile
Pollutants:
Manacle: pH and Sulfate
Cedar: Sulfate
Source: Manacle Creek Abandoned Mine Lands


State map showing location of watershed

TMDL Priority Ranking: Low

Description of the Problem

Beneficial uses of Manacle and Cedar Creeks

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life and Human Health associated with Fish Consumption

Use that is impaired

- Protection of Warm Water Aquatic Life

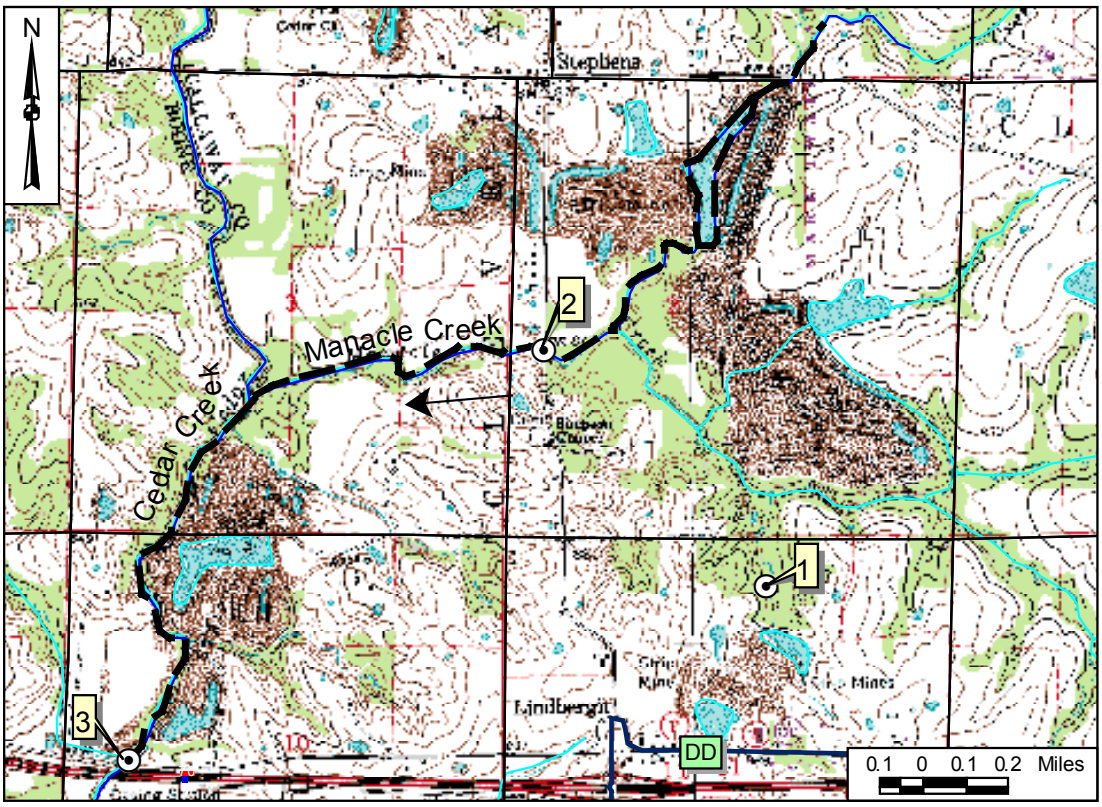
Standards that apply

- Missouri's Water Quality Standards (WQS), 10 CSR20-7.031 Section (4)(E), state that water contaminants shall not cause pH to be outside of the range of 6.5-9.0 SU (Standard Units).
- Sulfate and chloride are linked together in the WQS. Section (4)(L) states that the concentration of chloride plus sulfate shall not exceed 1000 mg/L (milligrams per liter) for protection of aquatic life.

Manacle Creek is a tributary to Cedar Creek, which runs along the boundary between Boone and Callaway Counties. The area around these streams (and even right through them) was mined for coal, and the coal wastes contaminated the water. Sulfide minerals, common in coal and the surrounding rock, oxidize in the presence of water and oxygen to form highly acidic (low pH), iron- and sulfate-rich drainage. The sulfate produced by this weathering may persist for a long time in water. Both low pH and high levels of sulfate are harmful to aquatic life. A TMDL was recently approved for upper Cedar Creek (also impaired for pH and sulfate) that recommended alkalinity producing cells to remedy the problems. Fixing the problems in Manacle Creek, however, will be more difficult because of

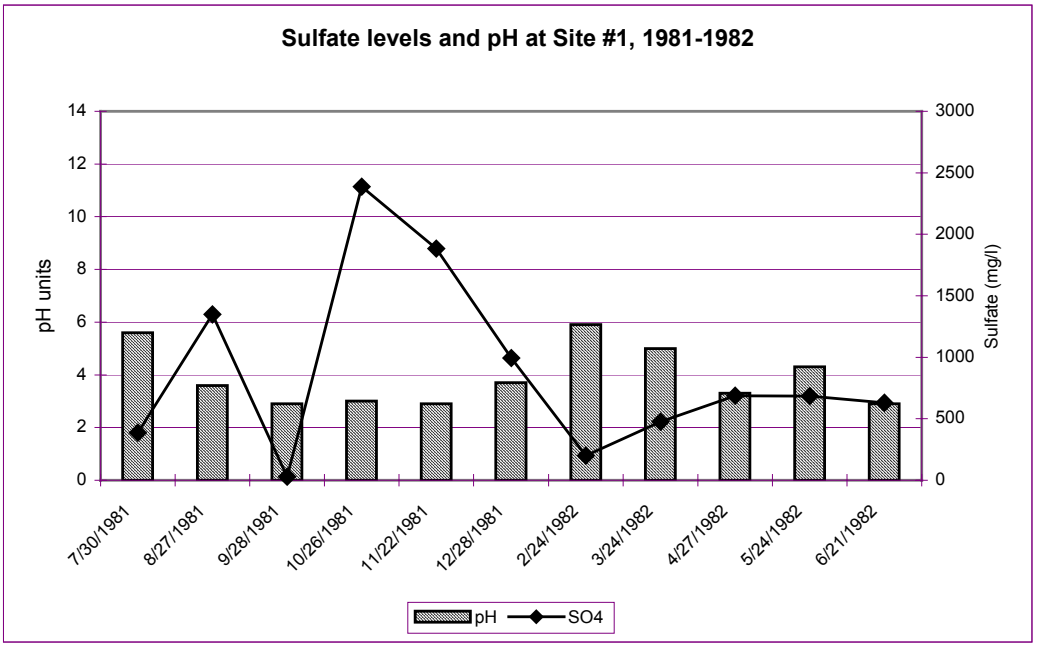
acidity forming underground and seeping directly into the stream. More data was collected in 2000 and 2001 to better define the problem and suggest possible solutions. A map of the area and graphs summarizing existing data can be found below.

Map of Manacle Creek, Sampling Sites and Mined Areas

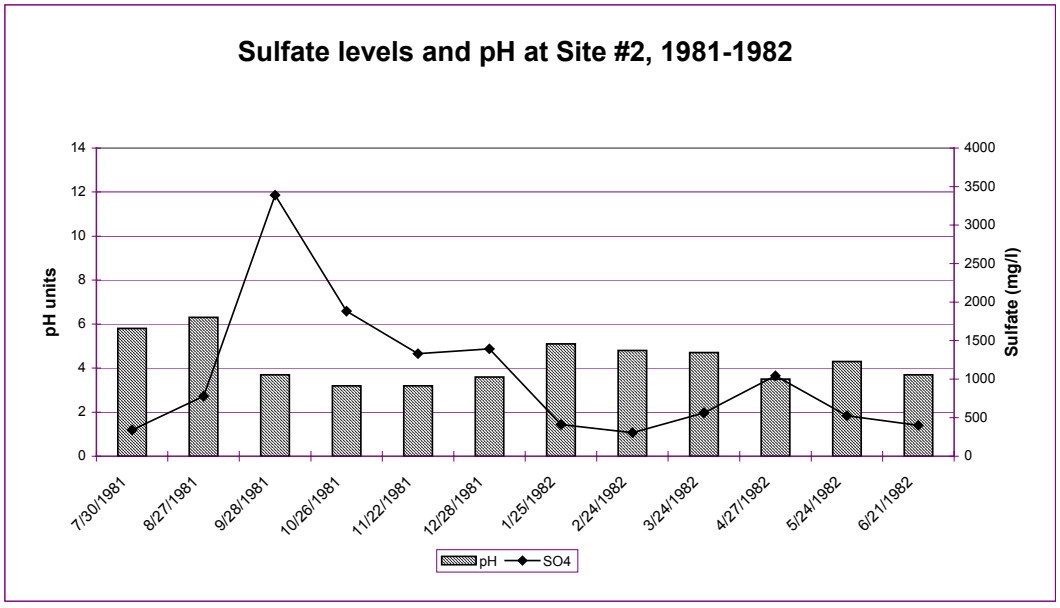


Impaired Segment ← Direction of Flow

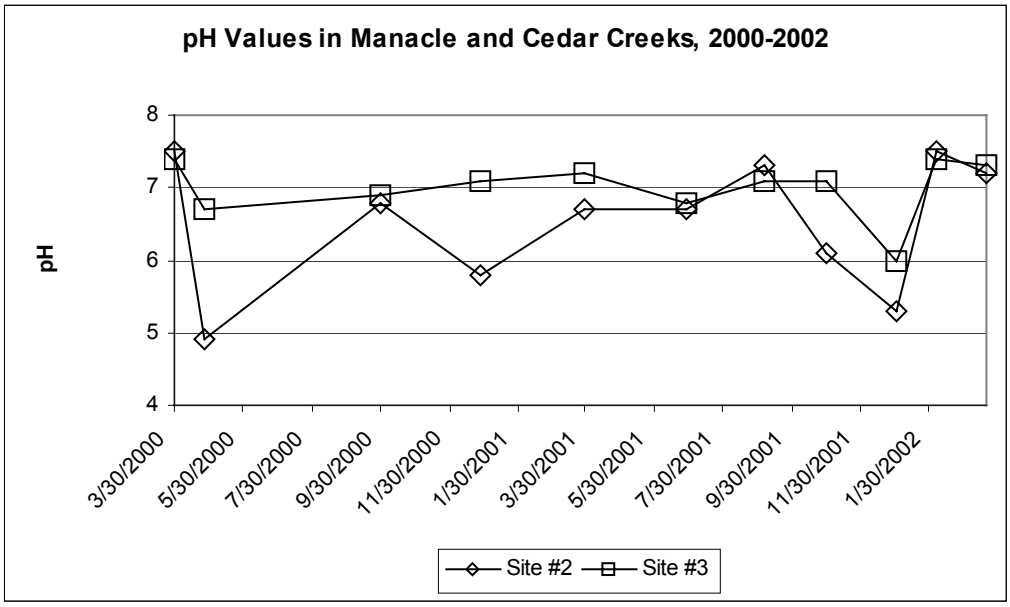
Site Index
1 – Tributary from reclaimed slurry pond
2 – Manacle Creek 0.5 mile south of Stephens
3 – Cedar Creek at Interstate 70



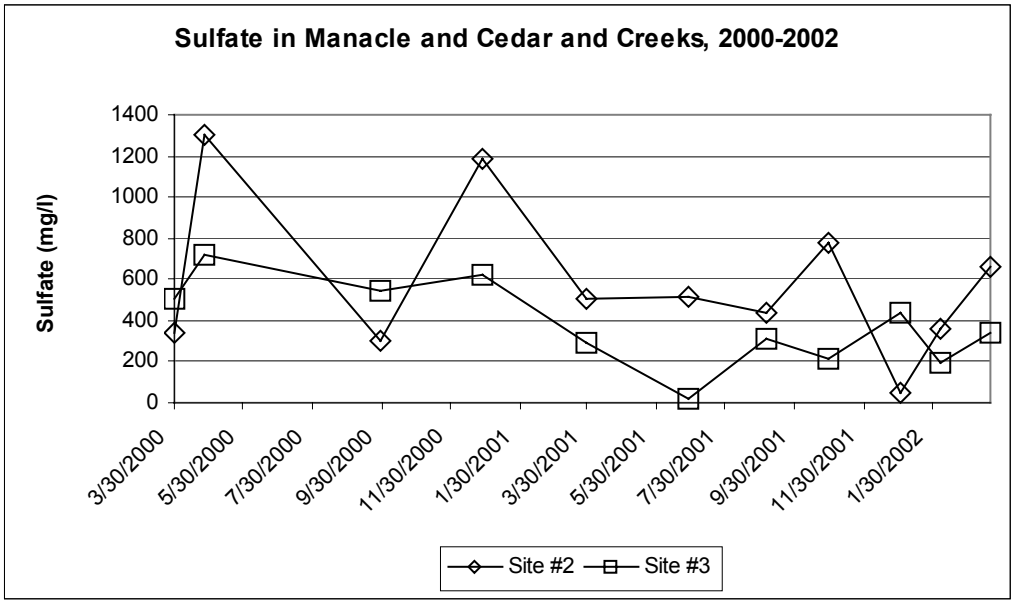
Source: Envirodine Engineers



Source: Envirodine Engineers



Source: Missouri Department of Natural Resources



Source: Missouri Department of Natural Resources

For more information call or write:

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